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Type I. Progress Report

Period ended January 31, 1973

- a - Title - ERTS Data User #119 - Effective Use of ERTS Multisensor Data in the Great Plains
- b - Principal Investigator number - Victor I. Myers UN-642
- c - Problems impeding progress -

A recent data request to NDPF has brought to light a problem concerning variation in the framing of ERTS imagery. An image with identifier 1023-16440 was obtained from the EROS Center at Sioux Falls, South Dakota and this same image was requested from NDPF. Upon receiving the NDPF image it was discovered that although the identifier was the same, the center coordinates differed considerably. The remainder of the annotation was the same except for the tracking station. The NDPF image indicated the Goldstone tracking station while the EROS imagery indicated a blank in the tracking station position. Other ERTS images were examined for similar framing and tracking-station variations. Two instances were found; however, the identifier in both instances had also changed slightly.

d - Accomplishments

1. Rangeland

No change from last report.

2. Cropland

(a) An area corresponding to a 2 mile x 9 mile section of of the Centerville study area was masked off on each of the four transparencies of the August 15 imagery. The 2 mile x 9 mile area corresponds to a 3 mm x 14 mm area on the transparencies. The initial masking operation was done on the band 5 transparency because the roads forming the boundaries of the study area are clearly visible in this band. The mask was made by applying opaque photographic tape directly to the transparency. To insure accuracy, the band 5 transparency was used as a reference for preparing masks on the other three transparencies. Each of the three remaining transparencies was placed on top of the band 5 transparency on a light table so that the fiducial marks coincided. The remaining masks were prepared to coincide with the band 5 mask. This procedure was accurate to within .05 mm.

N73-16338

(E73-10076) EFFECTIVE USE OF ERTS  
MULTISENSOR DATA IN THE GREAT PLAINS

Progress Report, period ending 31 Jan.  
1973 (South Dakota State Univ.) 4 p HC

\$3.00

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CSCL 08F G3/13 00076

(b) Band 5 was digitized by SADE at maximum resolution (36 points per mm). Band 5 was selected for initial analysis because it exhibited the greatest range of transmission values. This was determined by displaying each of the bands off line on SADE. A spatially correct printout of the transmission values was obtained to locate training fields of the various classes.

(c) The spatially correct printout proved to be impractical for analysis because of its size (6 ft x 24 ft). During the next reporting period a program will be written by RSI data specialists that will reduce the 0 to 255 range of transmission values into sixty-four increments of four values each. A specific character will be assigned to each of the increments. This will reduce the size and the cost of the print-out. All four bands will be digitized and printed out. The coordinates of the training fields in each of the four bands will be determined and compared to determine how accurately the four bands were registered. When accurate registration is achieved, classification will be performed.

### 3. Land Systems

(a) The Literature review on land classification is continuing.

(b) Scale enlargements to about 1:300,000 and 1:100,000 were analyzed for a portion of an ERTS frame (6 Sept.) from western South Dakota.

### 4. Data Analysis

(a) Various bands of selected ERTS imagery have been digitized with the SADE system. Correlations were calculated with available ground truth and transmission codes. The MSS 5 band data provided some correlations that were significant.

(b) Imagery from the Centerville area was obtained. It was noticed that the tracking station location makes a difference on the position of the data (see paragraph c, Problems). All four MSS bands were digitized and printed. Locations of fields are being done in preparation for the K-Class algorithm.

(c) The mode-seeking algorithm was tried on ground truth slides. The results are being analyzed to see how well it performs. Further investigation into the algorithm should allow it to be combined with the K-Class algorithm.

## e - Significant Results

### 1. Rangeland

No change.

## 2. Cropland

(a) The two major crops grown in the study area are corn and soybeans. Some small grains are grown, but were harvested at the time of the first ERTS overpass. The approach of this investigation has been to treat corn and soybeans as separate classes rather than as a single class entitled row crops. Based on digital analysis of band 5 and visual analysis of bands 4, 6, and 7, it has not been possible to separate corn from soybeans. It was possible to locate known corn and soybeans fields only if they were bordered by either fallow or grass. In band 5 there appears to be as much variation in transmission values between corn fields as there is between corn and soybeans. It appears that identification of corn and soybeans as separate classes may not be feasible for this particular point in the growing season (August 15).

(b) It is hoped that at other points in the growing season separation of corn from soybeans will be possible. Visual examination of September 5 imagery indicates that later in the growing season, this is possible. Quantitative results for August 15 and September 5 will not be known until classification is performed for these two sets of imagery.

## 3. Land Systems

(a) The resolution of the 1:300,000 scale enlargement remained sharp enough to distinguish features important for making soil association maps. The land use pattern (range vs cultivated) was sharp as were the stream bottoms, stream valley sides, and stock ponds. The resolution of the 1:100,000 scale enlargement was less sharp on detail but it appears that some features could be quantitatively analyzed. Among these are the hydrologic features present - stock ponds and the streams.

(b) It would appear that the total area of stock pond water on a frame could be measured, and, after ground truth established their average depth, the volume of water stored could be calculated and be monitored. The same procedure could be used to determine the volume of water in the streams.

f. - Published Articles - none

g. - Recommendations - none

h. - Changes in Standing Order Forms - none

i. - Image Description Forms - none

j. - Data Request Forms - none

k. - Other information - no change from the last report except for subparagraph [g] which reports significant changes in contractor

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